MP.1 Data Buffer Optimization

Once the dataBuffer size reached to 2, I erased the first element of the vector and pushed the new element at the end of the dataBuffer vector, maintaining the vector size = 2.

MP.2 Keypoint Detection

Implemented SHITOMASI, HARRIS, FAST, BRISK, ORB, AKAZE and SIFT feature detector using the opencv library and made them selectable on the basis string input. Separate member functions for SHITOMASI and HARRIS. Rest detectors were implemented under the function detKeypointsModern.

MP.3 Keypoint Removal

Used cv::Rect contains method to keep only those keypoints which lies inside the given rectangle dimension focusing on the preceding vehicle.

MP.4 Keypoint Descriptors

Implemented BRISK, BRIEF, ORB, FREAK, AKAZE and SIFT feature descriptor using the opencv library and made them selectable on the basis string input. All feature descriptors are implemented under the single member function descKeypoints.

MP.5 Descriptor Matching

Implemented FLANN matching and KNN selection criteria using opencv library and made them selectable using respective string in the matchDescriptors function.

MP.6 Descriptor Distance Ratio

K-Nearest-Neightbor matching is implemented keeping the descriptor distance ratio as 0.8.

MP.7 Performance Evaluation 1, MP.8 Performance Evaluation 2, MP.9 Performance Evaluation 3

Results for the above criterias can be found in the excel “Udacity_MidTermProjectResults_PrathameshBhamare.xlsx” inside the results folder of the package.

Top 3 selections:

1. FAST detector/BRIEF descriptor
2. FAST detector/ORB descriptor
3. FAST detector/BRISK descriptor

Top 3 were selected considering the no. Of keypoints detected and the average time taken to detect and compute the keypoint descriptors. Results are added in the same excel.

Observations:

1. While using SIFT descriptor, only the FLANN matching was possible. I was getting an error while using Brute Force approach. The results of the SIFT descriptor mentioned in the table are using FLANN matching.
2. AKAZE descriptor gave the error for all the combinations with different detectors. Tried all possible combinations. Couldn't figure out the exact reason for this. Though AKAZE detector was implemented successfully.